GAS TURBINE ENGINE SHAFT BEARING CONFIGURATION

[0001] This application is a continuation-in-part application of U.S. application Ser. No. 13/904,416, filed on May 29, 2013, which is a continuation of U.S. application Ser. No. 13/762,970, filed on Feb. 8, 2013, now U.S. Pat. No. 8,511,061 issued Aug. 20, 2013, which is a continuation of U.S. application Ser. No. 13/362,170, filed on Jan. 31, 2012, now U.S. Pat. No. 8,402,741 issued Mar. 26, 2013.

BACKGROUND

[0002] This disclosure relates to a gas turbine engine bearing configuration for a shaft. In one example, the bearing arrangement relates to a low shaft.

[0003] A typical jet engine has two or three spools, or shafts, that transmit torque between the turbine and compressor sections of the engine. Each of these spools is typically supported by two bearings. One bearing, for example, a ball bearing, is arranged at a forward end of the spool and is configured to react to both axial and radial loads. Another bearing, for example, a roller bearing is arranged at the aft end of the spool and is configured to react only to radial loads. This bearing arrangement fully constrains the shaft except for rotation, and axial movement of one free end is permitted to accommodate engine axial growth.

SUMMARY

[0004] In one exemplary embodiment, a gas turbine engine includes a core housing that has an inlet case and an intermediate case that respectively provide an inlet case flow path and an intermediate case flow path. The shaft supports a compressor section that is arranged axially between the inlet case flow path and the intermediate case flow path. A geared architecture is coupled to the shaft, and a fan coupled to and rotationally driven by the geared architecture. The geared architecture includes a sun gear supported on the shaft. A first bearing supports the shaft relative to the intermediate case and a second bearing supporting the shaft relative to the inlet case. The second bearing is arranged radially outward from the shaft.

[0005] In a further embodiment of any of the above, the shaft includes a hub secured to the main shaft. The compressor section includes a rotor mounted to the hub. The hub supports the second bearing.

[0006] In a further embodiment of any of the above, the inlet case includes an inlet case portion defining the inlet case flow path. A bearing support portion is removably secured to the inlet case portion. The second bearing is mounted to the bearing support portion.

[0007] In a further embodiment of any of the above, the inlet case includes a first inlet case portion defining the inlet case flow path. A bearing support portion is removably secured to the inlet case portion. The second bearing is mounted to the bearing support portion.

[0008] In a further embodiment of any of the above, the intermediate case includes an intermediate case portion defining the intermediate case flow path. A bearing support portion is removably secured to the intermediate case portion. The first bearing is mounted to the bearing support portion.

[0009] In a further embodiment of any of the above, the first bearing is a ball bearing and the second bearing is a roller bearing.

[0010] In a further embodiment of any of the above, the first and second bearings are arranged in separate sealed lubrication compartments.

[0011] In a further embodiment of any of the above, the second bearing and the geared architecture are arranged in a lubrication compartment.

[0012] In one exemplary embodiment, a gas turbine engine includes a core housing that provides a core flow path. The gas turbine engine includes a fan and a shaft that supports a compressor section arranged within the core flow path. The compressor section is fluidly connected to the fan. The compressor section includes a first pressure compressor and a second pressure compressor upstream from the first pressure compressor. The second pressure compressor includes multiple compressor stages. First and second bearings support the shaft relative to the core housing and are arranged radially inward of and axially overlapping with at least some of the multiple compressor stages. The gas turbine engine is a high bypass geared aircraft engine having a bypass ratio of greater than about six (6).

[0013] In a further embodiment of any of the above, combustor is fluidly connected to the compressor section. A turbine section is fluidly connected to the combustor. The turbine section includes a high pressure turbine and a low pressure turbine.

[0014] In a further embodiment of any of the above, the core housing includes a first inlet case portion defining an inlet case flow path, and a bearing support portion removably secured to the inlet case portion. A second bearing mounts to the bearing support portion.

[0015] In a further embodiment of any of the above, the core housing includes an intermediate case portion defining an intermediate case flow path, and a bearing support portion removably secured to the intermediate case portion. The first bearing is mounted to the bearing support portion.

[0016] In a further embodiment of any of the above, the multiple compressor stages include a variable stator vane array, rotatable compressor blades, and a fixed stator vane array.

[0017] In one exemplary embodiment, a gas turbine engine includes a core housing that provides a core flow path. The gas turbine engine also includes a fan and a shaft that supports a compressor section arranged within the core flow path. The compressor section is fluidly connected to the fan. The compressor section includes a first pressure compressor and a second pressure compressor upstream from the first pressure compressor. The second pressure compressor includes multiple compressor stages. The first and second bearings support the shaft and are relative to the core housing and are arranged radially inward of and axially overlapping with at least some of the multiple compressor stages. A combustor is fluidly connected to the compressor section. A turbine section is fluidly connected to the combustor. The turbine section includes a high pressure turbine and a low pressure turbine. The gas turbine engine includes at least one of a low Fan Pressure Ratio of less than about 1.45 and a low pressure turbine pressure ratio that is greater than about 5.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The disclosure can be further understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein: